<u>Question 1:</u> Describe in detail the incident that occurred at approximately 12:59 pm on July 13, 2013 (the Incident), that interrupted hazardous waste incineration operations at the Facility. Include, but do not limit your description to the following: the sequence of events leading up to, during and after the Incident; the cause(s) of the Incident; the type and extent of damage to equipment, operations and areas inside and outside the Facility; the effect on Facility operations and air emissions; and the Facility's response. Submit diagrams showing the items of equipment (including ductwork) involved and indicate the damage on the diagrams. Submit copies of any and all photographs taken of the equipment, damage and resulting emissions.

On July 13, 2013 at 12:59 pm a pressure event within the incineration system generated sufficient energy to damage the heat recovery boiler (HRB) and cause failure at the expansion joint for the ducting joining the HRB to the Spray Dryer (the Incident). The ducting itself was damaged and required complete replacement. This Incident resulted in the release of boiler ash and steam from the failed duct connection and a release of this material onto the surrounding equipment, the concrete below and a cloud of steam and ash that deposited outside the Facility fence line.

Process exception data was gathered from the Bailey DCS before, during, and after the Incident and is presented in Table 1, below. This table includes data recorded by several instruments in the incineration train and solids removal equipment, as well as quench tank water level data.

Date/Time	Slag Quench Level (inches)	SCC Pressure ("H2O)-A	SCC Pressure ("H2O)-B	Boiler Outlet Pressure ("H2O)	Spray Dryer Outlet Pressure ("H2O)	ESP Outlet Pressure ("H2O)	Primary Air Pressure ("H2O)
07/13/2013 12:58:06							0.219
07/13/2013 12:58:32		(0.126)					
07/13/2013 12:58:55	57.721			(0.514)			
07/13/2013 12:59:38		(0.459)	(0.459)	(0.068)			(0.116)
07/13/2013 12:59:39	59.222	3.679	3.885	2.315			17.727
07/13/2013 12:59:40		4.907	5.129	3.279	(2.327)	(3.310)	
07/13/2013 12:59:41	64.363			2.891	0.369	12.432	22.136
07/13/2013 12:59:43	58.733	2.375	2.458	0.618	0.351	5.757	1.740
07/13/2013 12:59:45	54.829	1.047	1.055	0.154	(3.440)	(3.558)	0.782
07/13/2013 12:59:46	51.598	0.535	0.544	0.034		(4.875)	
07/13/2013 12:59:47	48.032	0.335	0.344		(3.891)		
07/13/2013 12:59:48	44.383				(3.572)	(4.384)	
07/13/2013 12:59:49	41.143						
07/13/2013 12:59:51	38.679				(2.737)	(3.370)	
07/13/2013 12:59:52	36.951						
07/13/2013 12:59:53	35.850	0.144	0.152			(3.120)	
07/13/2013 12:59:55	34.924						
07/13/2013 12:59:56	33.974						0.523
07/13/2013 12:59:58	33.067						
07/13/2013 13:00:00	32.086						0.117
07/13/2013 13:00:06							(0.146)
07/13/2013 13:00:07	31.174						
07/13/2013 13:00:16	30.271						
07/13/2013 13:00:40	29.371						
07/13/2013 13:00:52		(0.009)	0.001				
07/13/2013 13:01:40	28.896						
07/13/2013 13:02:40	28.533						
07/13/2013 13:03:40	28.198						
07/13/2013 13:04:40	28.143						
07/13/2013 13:04:52			(0.006)				
07/13/2013 13:05:40	28.090						

Table 1: Event Pressure and Level Data

The total amount of ash and slag that fell from the Secondary Combustion Chamber (SCC) walls as a result of the Incident was captured on the slag scale as that material was transferred from the slag quench tank to a slag trailer. Based on weight change during this effort, it is believed that 21,421 pounds of material came down into the slag quench tank during this event.

The data suggests ash was released within the SCC. This ash was of sufficient volume to effectively draw flue gas back against the Induced Draft (ID) fan draw of the system, resulting in reduced boiler outlet negative static pressure and a temporary increase in negative static pressure in the SCC. The level of water in the slag quench tank was observed to increase by 1.5" at the time of the Incident and increase by 6.6" over the next 3 seconds. The tank level then dropped 28.35" over the next 29 seconds. At the time of the incident, people working in the Direct Drum Pump office heard a sustained rumbling noise for 5-8 seconds that sounded like the skip hoist was returning a skip box from the feed unit. This sound was likely the rapid steam generation occurring in the slag quench tank, which subsequently created the positive pressure in the SCC, HRB, and downstream solids removal equipment. Based in the physical attributes of the equipment, Heritage Thermal Services (HTS) believes that the steam generated was restricted at the boiler housing, water tubes, and ducting that connect the HRB to the spray dryer. HTS believes that the thrust generated by the steam was sufficient to bend boiler sections and tubes and push the ducting, tearing the expansion joint and causing the duct to pivot into the adjacent Electrostatic Precipitator (ESP) unit (1 – 2 psig overpressure). The pivot of this duct likely reduced the amount of ash that was released offsite by directing the bulk of the discharge to the ground beneath. The ID fan also continued to draw air after the breach, collecting some of the ash particles. A priority 1 alarm was transmitted to East Liverpool Fire Department (ELFD).

Once the water seal on the slag quench tank was compromised by the water vaporization, steam continued to evolve in this tank, generating outward thrust with corresponding displacement of solids, ash and steam up the slag conveyor and out of the top of the tank. This resulted in materials being projected and landing on the surfaces to the north of this area. The heat of some of these ash and slag particles was sufficient to ignite paper packaging materials approximately 30 feet to the north of the Slag Quench tank, creating small incipient fires between the boiler house and the slag canopy. These fires were extinguished by the East Liverpool Fire Department on their arrival.

Operators attempted to maintain OPLs after the breach in the ducting had occurred.

Facility response following the Incident included accounting for all personnel, completion of notifications, stabilizing the situation, and pursuing cleanup activities. Following the Incident, the Facility proceeded immediately into a previously planned outage.

In the days following the Incident, HTS completed an off-site sampling effort to evaluate the extent of the impacts from the Incident and the level of response necessary. HTS also canvassed the downwind neighborhood to assess the range of impacts based on visual observations. Based on the observations, clean up and response efforts were initiated. For further information on HTS's response actions, please see the July 26, 2013 7-13-13 Incident Release Report, included in HTS's response to Question 7. This report was submitted to the Ohio Environmental Protection Agency on August 1, 2013.

Based on the research and evaluations undertaken to-date, HTS believes it has identified the root cause of the Incident. HTS's investigation is ongoing, however, and it reserves the right to supplement or amend this answer to the extent new information is discovered.

After its initial investigation, HTS believes the root cause of the Incident was the presence of high melt point, fine particulate Fluid Catalytic Cracking (FCC) catalysts in the SCC. These materials are typically composed of synthetic zeolite compounds. Zeolites are crystalline alumina silicates that have an open, three dimensional structure containing certain cations. These cations are needed within the structure of the crystal to balance the electrostatic charge on the framework of the silica and alumina tetrahedra. As catalysts, these materials are engineered to utilize specific cations to produce the desired reaction within the refining process. The tetrahedra structure and small particle size give these materials a very high surface area for rapid heat exchange. The silica and alumina components also have a relatively high specific heat, roughly 1.4 KJoules/Kg C and higher.

When these materials are received in refinery wastes, they are fine particulate bound in an organic matrix. HTS believes that when these materials are incinerated, the fine particulate becomes entrained in the flue gas and accumulates on the surface of the nose of the SCC and below. The FCC catalyst materials have a very high melting point as well, so the accumulated material is never able to melt into a slag, but rather retains its crystalline structure. When some of this material falls into the slag quench tank, it generates steam very rapidly, both because of the heat that is held in the material and the rapid heat exchange caused by the particles' high surface area.

HTS estimates that as little as 224 lbs. of this material would contain sufficient heat to generate enough steam to take the volume of the Kiln, SCC and Boiler to 1 psig of pressure. This is consistent with what occurred during the Incident. At the very beginning of the Incident, there was an initial pressure drop from -0.126 inwc to -0.459 inwc. This drop was followed by a dramatic rise in pressure, seen almost instantaneously throughout the system. HTS theorizes that this initial pressure drop was caused by the initial fall of material from the nose. Approximately 42 cu ft of material evacuating the SCC would cause this pressure drop. At the measured specific gravity of the ash that fell initially during the Incident, 42 cu ft would equate to approximately 1800 lbs of ash, or more than enough mass to cause this pressure event.

The sudden, unexpected release of these materials from the SCC walls to a water-filled slag quench tank caused a flash steam explosion event, which HTS believes to be the root cause of the event. Please see the response to Question 6 for more detail.

The incident description was prepared by Stewart Fletcher with assistance from Bob Buchheit and Steve Lorah. The attached diagrams were added by Stewart Fletcher. The photographs were taken by Zachary Davis.

<u>Question 2:</u> Specify the time on July 13, 2013 when HTS initiated shutdown of the hazardous waste incinerator at the Facility and describe in detail the shutdown procedures used at that time.

The extreme pressure event on July 13, 2013 triggered an automatic waste feed cutoff (AWFCO) at 12:59:56 pm. Waste feeds ceased at this time and a shutdown of the incinerator was initiated.

Waste feeds were halted automatically and immediately by the Bailey Distributed Control System. The over-pressurization of the incineration system triggered an exceedance of the operating parameter for SCC pressure. This parameter exceedance engaged the AWFCO system that sends a computerized signal to the control mechanisms that "permit" the unit to feed Bulk Solids, Containerized Solids, and Liquid Lance Feeds to the incineration unit. All waste feeds were halted at that point with the exception of the purging of the liquid lances which initiates on lance shutdown. This purge period lasted approximately 30 seconds and any remaining material in the feed lances were purged into the combustion zone.

In addition to the halt of waste feeds, the pressure exceedance also initiated an immediate shutdown of the Front Wall Burner Combustion Air Fan, Front Wall Burner Cooling Air Fan, Primary Air Fan, and closed the Primary Air Fan Inlet Damper. These are safety and pollution prevention features that occur during pressure exceedances.

This response was prepared by Vince Waggle and Gary Jones.

<u>Question 2a:</u> Provide a spreadsheet showing the date, time, waste profile numbers, waste profile descriptions, and container numbers for all wastes that were being processed in the hazardous waste incinerator combustion chambers within an hour before and up to the time of the Incident. Also provide a spreadsheet showing the date, time, waste profile numbers, waste profile descriptions, and container numbers for waste containers that had previously been processed in the combustion chambers (for at least 2 weeks prior to the Incident) but might still be in the system (e.g., as slag or ash).

HTS has two distinct feed mechanisms for introducing containers of waste into the incineration system. They are the container feed mechanism and the skip hoist feed. The container feed mechanism accepts containers up to an 85-gal over pack that are delivered to the front wall of the rotary kiln via a conveyor system. The skip hoist feed system utilizes 1 cubic yard boxes through a tower elevator, which delivers smaller containers into the bulk feed hopper. Attached are two spreadsheets that list all containers and skip hoist feeds to the incinerator 1 hour and 2 weeks prior to the incident, respectively. The second part of Question 2a requests a spreadsheet of waste containers that had previously been processed in the hazardous waste incinerator, but might still be present in the system as slag or ash. HTS cannot determine with certainty the wastes for which some portion of the ash generated from their incineration may still have been present in the incineration system at the time of the Incident. All wastes generate ash, and some quantity of that ash, though very small, may still be present even weeks later. Because of this, all of the container and skip hoist feeds from the two week period preceding July 13, 2013 have been included in the spreadsheet. However, by providing this information, HTS is not admitting or representing that ash or slag from any specific waste container remained in the system at the time of the release.

Please see the attached spreadsheets for this data.

This response was prepared by Steve Lorah.

Question 2b: Specify the time that the hazardous waste feed was cut off to the hazardous waste incinerator following the Incident.

The extreme pressure event on July 13, 2013 triggered an automatic waste feed cutoff at 12:59:56 pm. Waste feeds ceased at this time and a shutdown of the Incineration System was initiated.

This response was prepared by Vince Waggle.

Question 2c: Specify what auxiliary fuels were being fired into the hazardous waste incinerator at the time of the Incident.

HTS sometimes feeds fuels deemed as non-hazardous to the incinerator during periods of startup and shutdown. There were no fuel feeds to the incinerator prior to or following the pressure event on July 13, 2013.

This response was prepared by Vince Waggle.

Question 2d: Specify the time when the auxiliary fuel feed(s) were cut off to the hazardous waste incinerator following the Incident.

HTS sometimes feeds fuels deemed as non-hazardous to the incinerator during periods of startup and shutdown. There were no fuel feeds to the incinerator prior to or following the pressure event on July 13, 2013. Thus, no fuel feeds were cut off to the hazardous waste incinerator following the Incident.

This response was prepared by Vince Waggle.

Question 2e: Specify the day and time when there was no longer any hazardous waste present in the combustion chamber following the Incident.

The Hazardous Waste Residence Time (HWRT) expired at 3:57:25 PM on July 13, 2013. The residence time was calculated in accordance with the HWRT calculation specified in the most recent Notice of Compliance with MACT Subpart EEE submitted to the Ohio EPA and US EPA by HTS on October 5, 2012.

This response was prepared by Vince Waggle.

<u>Question 2f:</u> Submit 1-minute total and pumpable hazardous waste feedrate data and 1-minute auxiliary fuel feedrate data starting on July 13, 2013 at 6:00 a.m. until the date of this information request.

The requested 1-minute total and pumpable hazardous waste feed data for the period of July 13, 2013 at 6:00 am to August 2, 2013 is attached. This data also includes the auxiliary fuel feedrate data for the same time period.

This response was prepared by Vince Waggle.

<u>Question 3:</u> List all the dates that HTS exceeded Operating Parameter Limits (OPL) and/or emission limits for the Facility on July 13 and afterwards until the hazardous waste residence time had transpired. For each day of exceedance, specify: the OPL and emission limit exceeded, the time period of exceedance, and the highest values of the exceeded OPLs and emission limits. Submit copies of HTS's operating parameter and emission monitoring data from July 6, 2013, to the present.

The operating parameter exceedances that occurred on July 13, 2013 from the time of the Incident until the HWRT expired at 3:57:25 PM on July 13, 2013 are listed in the following table:

MACT Operating Parameter Limit Exceedances for 7/13/2013				
OPL	Start Time	End Time	Max/min Value	MACT OPL
SCC Pressure Using Seals	7/13/2013 12:59:25	7/13/2013 13:00:28		< 0 in. w.c.
THC	7/13/2013 13:03:37	7/13/2013 14:03:34	20.8 ppm	<10 ppm
SCC Temperature	7/13/2013 13:07:46	7/13/2013 15:57:25	725 deg.	> 1747 deg.
Kiln Temperature	7/13/2013 13:18:38	7/13/2013 15:57:24	776 deg.	>1718 deg.
Process Gas Flow	7/13/2013 14:02:36	7/13/2013 15:57:25	74,132 wscfm	<67,505 wscfm
THC	7/13/2013 14:25:48	7/13/2013 14:57:23	11.08 ppm	<10 ppm
Scrubber ECIS Pressure	7/13/2013 14:25:49	7/13/2013 15:57:25	0 psi	>3 psi

<u>Question 3a:</u> Include all 1-hour and 12-hour rolling average data, as applicable to the particular OPL or emission limit being measured.

Please see the attached file for the data requested.

From the Incident through the end of the HWRT, several OPL issues occurred. During this time, there were two separate THC events as noted in the response to Question 3, above. The SCC Temperature event began within 10 minutes of the Incident. This was followed by the Kiln Temperature event within the next 10 minutes. A process flow event began about 40 minutes later.

This response was prepared by Gary Jones.

<u>Question 3b:</u> Include all instantaneous readings of secondary combustion chamber (SCC) pressure, ambient pressure, pressure in the inlet and outlet shrouds, and feed lance atomization pressure.

See the attached Excel spreadsheet for the requested data. The spreadsheet lists one minute readings for each parameter except ambient air pressure. HTS does not measure ambient air pressure.

Please note the attached data is submitted with the following comments:

All pressure readings are reported as inches WC.

HTS does not record instantaneous data. All data is logged as one minute averages. Although the data is logged as one minute averages, the OPL for SCC pressure is monitored and controlled instantaneously.

Regarding the lance atomization pressures, the OPL for this parameter is 30 psi. HTS does not measure and log lance atomization pressure, instead, each lance is equipped with a low pressure switch. Should the atomization pressure drop below the required 30 psi, then that lance is automatically shut off. Since HTS utilizes a low pressure switch, the data attached can be interpreted as follows: A (0) indicates that the lance atomization pressure is 30 psi or greater and a (1) indicates that the lance atomization pressure is less than 30 psi.

This response was prepared by Kevin Lloyd.

Question 4: In accordance with 40 C.F.R. § 63.1206(c)(3)(ii), state and explain whether all combustion gases during and after the Incident were ducted to the air pollution control system at the Facility while hazardous waste remained in the combustion chambers (i.e., the hazardous waste residence time had not transpired since the hazardous waste feed cutoff system was activated). Provide copies of the 1-minute flue gas flow rate data for the period beginning July 12, 2013 to the date of this information request. Describe and also indicate on the diagram submitted in response to item 1 above, the location of the flue gas flow rate measurement device for the air pollution control system at the Facility.

Facility process data reveals a loss of negative draft through the incineration system for 1 minute and 3 seconds following the July 13, 2013 Incident. During this 1 minute and 3 second period, a portion of the combustion gases were not routed to the air pollution control devices. HTS has no way to quantify the amount of combustion gas that escaped.

Video evidence and SCC pressure data indicate that the incineration system's Induced Draft (ID) fan provided sufficient negative draw to overcome the breach in the system and prevent further combustion gas release after this 1 minute and 3 second period.

The 1-minute flue gas flow rate process data for the period beginning July 12, 2013 through the date of this information request accompanies this response.

The locations of the flow monitoring devices are indicated on the attached diagram.

This response was prepared by Vince Waggle and Kevin Lloyd.

Question 5: Submit copies of any and all analyses related to the amount of combustion gases, ash, and any other pollutants released from any breach(es) that occurred in the hazardous waste incineration system at the Facility on July 13, 2013. Explain all calculations and assumptions related to each analysis.

HTS does not possess the ability to determine the amount of combustion gases that were released through the breach in the boiler outlet duct during the 1 minute and 3 second over-pressurization event that occurred at the outset of the Incident. During the over-pressurization event, some of the combustion gases were still being routed through the incineration system and some combustion gases escaped through the damaged outlet duct. Since some of the combustion gases were still being routed through the incineration system, HTS is unable to estimate the amount of combustion gases that escaped the incineration system.

Heritage Thermal Services estimates that 761 pounds of boiler ash was released beyond the Facility fence line as a result of the 7/13/13 Incident. Below are the facts and operational knowledge assumptions that HTS used to arrive at the 761 pound estimate.

Facts

- The boiler has three (3) banks of boiler tubes
- Manufacturer's manual provides the surface area for each bank of boiler tubes
    - 1st bank of tubes 4,185 ft^2
    - 2nd bank of tubes 5,715 ft^2
    - 3rd bank of tubes 9,375 ft^2
- HTS was processing a waste stream which acts as a cleaning agent
- Boiler was within normal operating range based on pressure and temperature indicators
- Based on HTS's operational experience:
    - The 1st bank of tubes collects more particulate than the 2nd or 3rd
    - The 2nd bank of tubes builds more particulate than the 3rd bank
- Results from lab analysis of boiler ash for density was 0.698 g/ml
- ID fan was still maintaining a negative pressure on the system after the initial explosion (video)

Operational Knowledge Assumptions

- Boiler would not have an excessive build up due to waste stream that acts as a cleaning agent
    - 1st bank of tubes had ¼" scale which convert to 87 ft^3 of ash
    - 2nd bank of tubes had 1/8" scale which converts to 59 ft^3 of ash
    - 3rd bank of tubes had 1/16" scale which converts to 48 ft^3 of ash

    194 ft^3 of boiler ash were in the boiler at the time of the incident, which converts to 8,452 lbs of ash (using density obtained from analysis)

  Based on the design of the boiler, location of the bank of tubes, and force of the pressure surge: 30% of the boiler solids (ash) left the boiler
- Based on the design of the boiler outlet duct, which forced the material towards the ground; the force of the release; and the ID fan continuing to maintain a negative draw:
    - 30% of the release material traveled beyond the fence line

Conclusion

- Based on the design of the boiler, location of the bank of tubes, and force of the pressure surge:
    - **Approximately 2,536 lbs left the boiler (30% of 8,452 lbs)**
- Based on the design of the boiler outlet duct forcing the material towards the ground, the force of the release, and the ID fan continuing to maintain a negative draw:
    - **Approximately 761 lbs was not captured by the system or forced to the ground (30% of 2,536 lbs)**

HTS has not identified any data indicating that any other pollutants were released through the breach. The available data indicates that the only pollutant released was ash. The amount of ash released is estimated to be 761 lbs.

This response was prepared by Carrie Beringer.

<u>Question 6:</u> Provide the results of all investigations into the cause of the Incident, the appropriate measures that could have been taken to prevent the Incident from occurring, and the steps HTS has taken and/or will take to prevent future occurrences. Provide copies of all your findings, conclusions and corrective measures taken or planned for the Facility by HTS, its agents, contractors, or others.

Ash or slag occasionally builds up at the end of the kiln or in the SCC. When the weight of this ash or slag becomes such that it can no longer support itself, this material falls. Directly beneath the SCC is a tank of water called the slag quench tank, which serves two purposes; it provides a seal in the system to maintain a negative pressure, and it quenches the slag coming out of the kiln. Ordinarily, when slag or ash falls into this tank, the heat transfer takes place relatively slowly, and the material is cooled by the evaporation of the water in the tank. A problem occurs when the ash that falls into this tank is of such a nature that the heat transfer occurs very rapidly. This type of ash that causes a heat transfer to occur very rapidly is referred to as energetic ash. Depending on the mass of this type of ash that falls into the slag quench tank, enough steam can be generated from the water evaporating to cause pressure throughout the incineration system. If enough pressure is generated, damage to the system can occur.

Since April of 2011, HTS has been working to correct the problem of energetic ash discharging into the slag quench tank. Following an incident on April 12, 2011, it was determined that the ash that fell was high in aluminum silicates. Initially, there were several competing theories for the potential root cause of this April 12, 2011 incident. There is more discussion in the response to question 13e on these other potential root causes. Following that investigation, HTS believed that certain types of refinery wastes that were high in aluminum silicates were responsible for this high energy ash collecting in the SCC. HTS addressed this concern by limiting the receipt of a particular waste stream from a specific refinery. Specifically, HTS put shipping limitations into place for this stream and similar waste streams.

After another incident in December of 2011, it was determined that all wastes from this specific refinery were no longer to be accepted. At that time, HTS believed the problem was isolated to this one generator. HTS approvals chemists, who determine whether HTS will accept particular waste streams for incineration, were instructed to decline the approval of waste streams containing aluminum silicate catalysts from refineries in bulk. This approach seemed to be effective for over a year.

In March of 2013, there was a significant energetic ash fall in the SCC. There was no damage to the facility due to this event; however, it was clear to facility management that the problem of the energetic ash had not been completely addressed by the rejection of waste streams containing aluminum silicate catalysts. HTS engaged the Heritage Research Group (HRG) in Indianapolis, to assist with determining the cause of the energetic ash problems. With HRG's assistance, HTS determined that certain types of FCC (Fluid Catalytic Cracking) catalysts can be problematic in this regard. These types of catalysts are principally composed of synthetic zeolites, which is a crystalline form of aluminum silicates. These types of zeolites have an extremely high internal surface area which allows for rapid heat transfer. Ash that is generated from this type of material is very energetic. The findings of this study are produce in the attached report by Dr. Ralph Roper.

Following the March 2013 incident, HTS began testing every bulk delivery from refineries for aluminum and silicon in an attempt to screen out significant concentrations of these zeolite catalysts. Additionally, HTS began testing for several rare earth elements that are common in these types of catalysts. This testing was done by Inductively Coupled Plasma (ICP) methods following a nitric acid digestion under SW846 3050 and 3051. Using this approach, HTS rejected 3 bulk loads in a period of 4 months. HTS also recognized that these methods had their limitations, and began the process to obtain an X-ray Fluorescence (XRF) instrument.

HTS was in the process of obtaining the XRF when the incident on July 13, 2013 occurred. It was determined that analysis of these wastes by ICP methods were not completely detecting the elements of concern. This allowed for waste to be received into the facility that contained these zeolite catalysts of concern but went undetected. As corrective action following the July 2013 Incident, HTS has implemented a policy under which, all wastes from refineries must now undergo a pre-acceptance analysis by XRF before they are accepted. Also, each load of material from refineries must undergo a fingerprint analysis by XRF prior to being processed by the Facility. In addition, HTS is obtaining samples from these refineries of the spent catalyst to compare against the waste on XRF. By this method, HTS can compare the ratios of these elements in the waste to the elements in the spent catalyst to see definitively if the catalyst is present in the waste.

This response was prepared by Steve Lorah.

<u>Question 7:</u> Provide copies of all reports, documents, and electronic mail messages HTS sent to the Ohio EPA and/or the National Response Center regarding the Incident.

See the attached Excel spread sheet for a list of reports, documents, and electronic mail messages HTS has sent to the Ohio EPA and/or the National Response Center (NRC) regarding the Incident. Copies of the documents described in the Excel spreadsheet are also attached.

HTS reported the Incident to the NRC by calling the NRC hotline. The case number for the NRC report is 1054186.

This response was prepared by Carrie Beringer.

<u>Question 8:</u> As defined in 40 C.F.R. § 63.2, "malfunction" means any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions. For each exceedance identified in response to item 3, above:

<u>Question 8a:</u> Identify whether HTS claims that the exceedance was caused by a malfunction, as that term is defined by 40 C.F.R. § 63.2:

HTS identified the Incident and the resulting exceeedances of Facility operating parameter limits as malfunctions. HTS reported these malfunctions to the Ohio EPA.

This response was prepared by Vince Waggle.

<u>Question 8b:</u> Explain how the claimed malfunction fits the definition of malfunction at 40 C.F.R. *§* 63.2

HTS believes that the initiating cause of the Incident, Clinker Fall involving energetic ash, meets the definition of a malfunction as defined in 40 C.F.R. 63.2. Under 40 C.F.R. 63.2, malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. As described in response to Question 1 and 6, this event was both sudden and not reasonably preventable by HTS. Moreover, HTS could not have foreseen, avoided, or planned for the excess emissions caused by the Incident.

HTS has had many minor pressure exceedances in the past caused by clinker falls. *See* Response to Question 13e. Clinkers are the hardened combustion remains present in a furnace or incinerator. These can build up on the ceiling and sidewalls of the SCC eventually dislodging and falling into the quench tank. When these hot masses fall and strike the water, a rapid expansion of steam may occur. This steam expansion typically causes a minor pressure increase within the incineration system resulting in minimal damage and exceedances. In contrast, “energetic ash” clinker falls have been relatively rare and, as described in more detail in the response to Question 6 and 13e, have been the subject of investigations over the past 2 years by HTS. *See* Response to Question 8c. Prior to the incident, HTS reasonably believed that, based on its investigations, the “energetic ash” clinker falls had been addressed by a revised waste characterization and acceptance process. Thus, HTS could not foresee that its waste screening method would fail to identify all wastes of concern, resulting in the July 13, 2013 “energetic ash” clinker fall incident.

HTS does not have the ability to regulate clinker build-up on the SCC walls nor anticipate when the material will fall. As a result, when this occurs and leads to an exceedance of a MACT parameter, HTS believes the event to be a process malfunction.

Moreover, HTS does not believe that these events are the result of inadequate operation or maintenance practices. In order to prevent excess emissions to the maximum extent practicable during clinker falls, HTS maintains a waste feed cutoff system and other operational interlocks that minimize their potential impact.

As described in the response to Question 1, the hazardous was incinerator was shut down immediately following the Incident to ensure expeditious repairs and minimize the amount of emissions and their effect on ambient air quality. Further, all emission monitoring systems were kept in operation during and after the emissions event, and HTS's actions were documented.

Following the Incident, HTS immediately notified Ohio EPA and local response authorities. It also contacted the National Response Center.

This response was prepared by Vince Waggle.

Question 8c: Identify the malfunction that HTS claims caused the exceedance.

HTS has identified this event as a Clinker fall malfunction. Clinker is a generally accepted industry term that refers to the hardened, non-combustible remains that accumulate in a furnace or incinerator. However, based on its intense evaluation of the April 12, 2011 event and, over the past two months, the Incident (See Response to Question 6, above, and Question 13e, below), HTS believes that this energetic ash clinker fall is qualitatively different from the typical clinker falls that are discussed in its SSMP. Accordingly, HTS intends to discuss amending its SSMP to address this energetic ash clinker fall malfunction with the Ohio Environmental Protection Agency after data from the planned brief September outage discussed below is collected and analyzed.

This response was prepared by Vince Waggle.

Question 8d: Identify whether, and if so where, the claimed malfunction is addressed in the applicable Startup, Shutdown and Malfunction Plan (SSMP) for the Facility

The malfunction of "Clinker" has been listed in the Facility's Startup, Shutdown, and Malfunction Plan since Revision 1 of the plan dated February 27, 2004. At the request of Ohio EPA, a detailed description of this malfunction was included in Revision 8 dated June 12, 2009.

This response was prepared by Vince Waggle.

Question 8e: To the extent not provided in response to question No.6, above, provide copies of all documents referencing the investigation of the cause of the exceedance; the corrective actions taken to correct the exceedance; and any evaluations of approaches to minimize the frequency, duration, and severity of the exceedance.

HTS has no more information to provide that was not provided to the response to Question 6.

This response was prepared by Carrie Beringer.

Question 9: On June 12,2009, December 9, 2010, May 1, 2011 and July 5, 2012, HTS made revisions to its SSMP for the Facility. Submit copies of these revisions (Nos. 8, 9, 10, and 11) and all other revisions to the SSMP made during the time period from June 12, 2009 to the present.

Question 9 requests copies of four revisions of the Facility's SSMP. Copies of the requested SSMP revisions accompany this letter. However, the date listed in EPA's information request for Revision 9 is incorrect. The correct date for Revision 9 is 2/11/2010, not 12/9/2010. This mistake may stem from HTS' most recent Semi-Annual Start-up, Shutdown, and Malfunction Report. HTS has discovered that the date listed for revision 9 of the SSMP on that report is incorrect, and will correct this typographical error in future correspondence and reports. There were no other revisions made to the SSMP during the time period from June 12, 2009 to the present.

HTS claims certain information contained in these revisions to be Confidential Business Information (CBI). As a result, for the purpose of this information submittal, HTS is claiming CBI protections for certain pages of Revisions 8,9,10, and 11 of the HTS Start-up, Shutdown, and Malfunction Plan. These pages of the Revisions are marked "Confidential."

This response was prepared by Vince Waggle.

Question 10: Submit copies of all correspondence between HTS and Ohio EPA regarding SSMP Revisions 8, 9, 10, and 11 and all subsequent SSMP revisions for which HTS submitted information in response to item number 9 above.

On May 6, 2009, Pam Korenewych of Ohio EPA visited the Facility to conduct a Title V inspection. During the visit, certain elements of the Facility's SSMP were discussed. The attached letter, dated 12/21/2009, summarizes the discussion and Ohio EPA's request for more information to be included in the SSMP. The requested information was included in revision 8 of the SSMP and submitted to Ohio EPA on June 15, 2009, prior to HTS' receipt of Ms. Korenewych's letter.

Revision 9 of the SSMP was created as a result of the completed MACT Comprehensive Performance Test and resulting changes in operating parameter limits. A malfunction for Feed Chute Maintenance was added and one for Faulty Lab Data was removed. No conversations were documented with Ohio EPA regarding this revision and the document was not submitted to Ohio EPA.

Revision 10 of the SSMP was created to incorporate a discussion of the exceedance investigation process and include additional malfunctions identified during an internal review. This revision was submitted without documented discussion to Ohio EPA on May 4, 2011.

Revision 11 of the SSMP was the result of deficiencies identified through a MACT compliance audit conducted by a third party. Minor changes were made to correct some of the language of the plan that was identified by the auditor as not meeting the intent of the regulations. There were no discussions regarding this revision with Ohio EPA and, due to the minor nature of the changes, the plan was not submitted to Ohio EPA.

The following table summarizes the correspondence related SSMP Revision Nos. 8, 9, 10, and 11.

	Date submitted to Ohio EPA	Documentation	Correspondence with Ohio EPA or rea for change
Revision 8 - June 12, 2009	6/15/2009	Submission notification attached	No email conversations were held regarding these revisions. Conversatio were held in person and via telephone regarding the SSMP with P. Korenewy in May 2009 leading to Revision 8. See 12/21/2009 letter from P. Korenewych
Revision 9 - February 12, 2010 (typo in MACT report lists this date as December 9, 2010).	not submitted		No conversations were held with OEP regarding this SSMP revision. Changes were made to SSMP to include new MACT OPLs and malfunction lists were revised slightly.
Revision 10 - May 1, 2011	5/4/2011	Submission notification attached	No conversations were held with OEP regarding this SSMP revision. Changes were made to the exceedance investigation process and additional malfunctions were included.
Revision 11 - July 5, 2012	not submitted		No conversations with OEPA regarding the SSMP. Changes were made based recommendations from the 2012 MA Compliance Audit conducted by Strat (T. Schomer).

HTS has submitted copies of its SSMP to the regulatory agencies upon request or in the case of a major change to the plan. All revisions of the SSMP are maintained onsite as part of the Facility's operating record.

This response was prepared by Vince Waggle.

<u>Question 11:</u> Identify all periods of startup and shutdown of the Facility between July 12, 2013 to the present.

Question 11 requests information on each period of startup and shutdown of the Facility from July 12, 2013 to the present. The Facility itself was not shutdown or started up during this time period. However, the incineration system did enter a shutdown period at 12:59:56 PM on July 13, 2013. At that time, the incineration system began a pre-planned outage that had been scheduled to begin on July 14, 2013. The shutdown period lasted until 3:57:25 PM on July 13, 2013,when HWRT had expired. There were no auxiliary fuel feeds to the incinerator after the onset of the shutdown. Following this outage, the Facility began startup of the incinerator with auxiliary fuels on July 29, 2013 at 1:04 AM. Hazardous waste burning operations resumed on July 30, 2013 at 7:04 PM. A brief shutdown period of the Incineration System began on July 30, 2013 at approximately 11:10 PM. At this time, HTS began cooling the Incineration System so that a repair could be made to a boiler tube that had sprung a leak. Repairs were completed and startup began at 12:06 PM on July 31, 2013. There were no operating parameter limit exceedances as the result of the shutdown for the boiler tube repair.

No other startup or shutdown periods occurred between 7/13/2013 and 8/2/2013.

This response was prepared by Vince Waggle.

<u>Question 12:</u> Submit a copy of the latest version of the Operation and Maintenance Plan for the Facility prepared in accordance with 40 C.F.R. § 63.1206(c)(7).

Revision 2 of the Facility's Operation and Maintenance Plan dated July 3, 2012 is attached.

This response was prepared by Vince Waggle.

<u>Question 13:</u> Regarding the Facility's ash (or slag) removal system, answer the following questions:

<u>Question 13a:</u> Describe the ash/slag removal system and include diagrams and photographs of the system.

The HTS Facility utilizes a slag quench tank and conveyor for the removal of slag and ash from the kiln and secondary combustion chamber (SCC). The slag quench tank is a reinforced steel tank that is filled with water and located at the ground level beneath the junction of the rotary kiln and SCC. The tank is stiffened to withstand the pressure surges that could be caused when hot slag enters the quench water. The slag quench tank is equipped with a steel belt conveyor which transports slag and ash from the slag quench tank.

This system performs three functions:

1) The slag quench tank, filled with water, acts as a cooling bath for the slag and ash that enter the tank from the rotary kiln and SCC.

2) The belt conveyor, located at the bottom of the tank, removes the slag and ash by carrying it up an incline plane and de-watering the slag and ash before depositing it into an end-dump truck.

3) The slag quench tank acts as a water seal for the SCC to prevent air in-leakage. This is accomplished by the transition chute of the kiln and SCC extending below the water line of the tank. This water seal acts as a pressure relief vent for the system. This seal is maintained at 8.5 inches WC.

Diagrams and a photograph of the Kiln/SCC and Slag Quench Tank with Conveyor are attached.

This response was prepared by Kevin Lloyd.

Question 13b: Describe the procedures used for the removal of ash/slag from the interior surfaces of the combustion chambers, the handling of the ash/slag and the disposal of it.

When the incineration system is on line and processing waste feeds, the kiln and SCC continuously discharge to the slag quench tank, thus maintaining a constant flow of residuals which minimizes build up in the combustion chambers.

When the incineration system is off line, the interior surfaces of the combustion chambers can only be cleaned when the system has had a chance to cool for at least 24 hours. Once the system has sufficiently cooled, four man doors on the SCC can be opened to provide access to the SCC. HTS then employs a contractor which utilizes a high pressure water blaster to clean the walls of SCC. This water blaster operates with sufficient pressure and volume to remove any build up from the walls of the SCC. The cleaning of the interior walls of the combustion chambers is limited to the SCC since the slag build up in the kiln is insignificant and only forms a thin layer of slag.

Any slag or ash that is removed from the walls of the SCC falls into the slag quench tank and is then conveyed out of the system to an end-dump truck in the same manner as normal operation. This material is treated as hazardous waste like any slag or ash that is generated during normal operation at this Facility and is disposed at a hazardous waste landfill.

This response was prepared by Kevin Lloyd.

Question 13c: Specify the amount of ash that the ash quench system is designed to safely handle, specify the amount of ash that dropped into the quench system on July 13, and explain the reason that the amount of ash that fell from the interior walls of the combustion chambers on July 13, 2013 was greater than the amount the ash system could safely handle. Submit and explain all calculations and submit copies of all supporting documentation.

The slag quench tank and conveyor is designed for the collection and cooling of slag, hot metal, and fly ash from the kiln and SCC. The system is designed to safely handle 4400 lbs /hour under normal conditions and 30,000 lbs / hour under maximum conditions.

The amount of ash that fell during the July 13, 2013 incident was approximately 22,000 lbs. over the time period of the event plus one hour. This data was collected from the truck scale that is used for filling end dump trailers for slag.

The amount of slag / ash that fell during the July 13 incident did not exceed the maximum capacity for the slag quench tank and conveyor. This conclusion is supported by the fact that there was no damage to the slag quench tank or conveyor.

HTS believes that the damage that resulted to the boiler outlet duct was not related to the amount of ash that fell, but rather the type of ash that fell. HTS believes that the ash that fell had a very high melting point (higher than the temperatures in which the HTS incinerator operates) and a very small particle size. The small particle size resulted in an ash that had a very high surface area. When this material fell into the water quench, the result was an extremely fast transfer of heat which then produced a large amount of steam in a very short period of time. This steam generation produced a pressure wave that overcame the capacity of the boiler outlet duct. *See* Response to Question 6 for more detail.

This response was prepared by Kevin Lloyd.

__Question 13d:__ In the weeks prior to the Incident, explain whether HTS personnel or HTS contractors made any observations regarding the amounts of ash being collected in the quench tank or otherwise being removed from the combustion chambers. Submit copies of all relevant documents.

There were no documented or reported observations made by HTS or contractors regarding the amount of ash being collected by the quench tank or being removed from the combustion chambers in the weeks prior to the incident. There were no significant changes regarding the slag/ash generation rate.

This response was prepared by Kevin Lloyd.

__Question 13e:__ Have there been previous incidents when ash or slag fell into the quench bath, resulting in the Facility exceeding one or more of an applicable OPL? Explain each such incident. Provide copies of all documents referencing the investigation of the cause of the exceedance(s); the corrective actions taken to correct the exceedance(s); and the evaluation of approaches to minimize the frequency, duration, and severity of the exceedance(s), and submit all supporting documentation.

There has been one other event in which ash or slag had fallen into the slag quench tank and resulted in equipment damage. This event occurred on April 12, 2011, and also resulted in damage to the boiler outlet duct.

This issue has been very complex to investigate. At the time of the April 12, 2011 incident, Baker Risk was retained to assist with the investigation. Their report is also attached. The report itself points to a vapor cloud explosion in the boiler as the event that caused the damage. In reviewing the files, the initial draft of their report (also attached) identified a rapid steam expansion as the most likely cause of the event. This type of scenario is capable of generating the damage noted in both the April 12, 2011 event and the Incident. The team investigating the 7/13 event reviewed the final Baker Risk report and found it improbable and based on some questionable data assumptions. The questionable assumptions included use of THC data measured in the stack, estimating time between generation of the THC and measurement, and using this time to superimpose this measurement onto actual process pressure data measured within the process unit (the SCC) itself. Baker Risk used this assumption to postulate that the THC existed in the boiler before the pressure event and further that it was present in sufficient concentration to provide a fuel for an ignition even with a process flow of greater than 60,000 scfm (wet). There was no identification of an ignition source or how sufficient oxygen would have been present if there was unburnt fuel present.

HTS believes that a much more likely scenario is that the pressure event from sudden steam generation pushed some unburnt hydrocarbon through the system to the monitoring device. This is further supported by the reduction of oxygen measured in the SCC during the event, as steam would have displaced oxygen creating an oxygen-depleted situation. The credibility of the final Baker Risk report was further eroded by its conclusion that a series of three events occurred together, yet none of these events were readily observable in the process data collected. The timeline of events relative to the April 2011 event was assembled by HTS and provided to Baker Risk for its use. In discussions with the primary investigator from Baker Risk, it was noted that events that Baker Risk theorized may have occurred would have had to have occurred between recorded data points and there was no real physical or observed evidence that supported this so-called "deflagration scenario" other than the equipment damage. The chain of events described in the final Baker Risk report was much more complex than what HTS believed occurred during both the April 2011 and July 2013 incidents, with the introduction of a concentrated amount of hot FCC catalyst into the slag quench tank with a subsequent generation of damaging steam pressure. *See* Response to Question 6.

In March of 2013, there was a pressure event that exceeded OPLs and displaced water from the slag quench tank. There was no damage to the boiler outlet duct or expansion joints. An investigation into this event led to further characterization of FCC catalyst materials within specific waste streams and a supporting document generated by the Heritage Research Group. *See* Response to Question 6. This document provided guidance on the components of interest and their relative proportions in refinery wastes. A testing approach was instituted subsequent to this event that required analysis of all refinery waste streams being received to look for high concentrations of aluminum. If a concentration above 1% by weight was found, an analysis for silica content was performed to compare these two components proportionally. In addition, the plant purchased standards to allow for testing of rare earth metals. If the aluminum and silica were found in high concentrations and at proportions identified in FCC catalysts, then the rare earth minerals were tested using ICP methods and the results were used to reject materials likely to be FCC catalysts. In addition, the plant pursued obtaining an XRF instrument, which had been identified as the preferred instrument for analyzing for these materials. HTS located an instrument and spent approximately $17,000 refurbishing this equipment. This equipment was introduced at the plant after the 7/13 Incident.

During the investigation of the 7/13 Incident, limitations of ICP analysis were identified as a contributing cause to the approval of and ultimate introduction of FCC contaminated refinery waste to the kiln train. *See* Response to Question 6. Limitations in effectiveness of the digestion portion of the method used caused the amount of aluminum to be understated and, as a result, the test results did not trigger further review on loads that were introduced prior to the Incident. Due to low solids inventory levels in the feed pits just prior to the event, these materials containing FCCs were fed without any significant amount of other solids material and are believed to have introduced a sufficient quantity of FCC catalyst fines to have initiated the event in the secondary combustion chamber and the slag quench tank.

The acceptance of all refinery wastes was discontinued while the investigation proceeded. A refinery overview was completed, identifying: potential sources of the materials of concern, generating processes, events that might generate these materials, and waste stream describers that would likely contain these materials. This information was provided to the Waste Approvals group at HTS for purposes of requiring more detailed generating source information when generators approach HTS about handling any of their refinery waste streams. Further, a review was completed identifying relative levels of refinery-generated wastes historically managed by HTS, and concluding that significant quantities of these wastes had been processed through the Facility throughout 2012 without issue. Ultimately, this review determined that there were some refinery waste streams that were not problematic. These waste streams were listed and will continue to be accepted at HTS. Each load of these materials continues to be screened by XRF, however, and Heritage has obtained a sample of spent FCC catalyst from each these sites for purposes of establishing a finger-print for comparison with samples from each load. *See* Response to Question 6. All other waste streams from refineries are not being processed through the HTS incinerator.

In order to confirm our analytical approach for acceptance of the limited refinery waste, HTS plans to conduct a brief outage in September to evaluate the condition of the SCC, looking for any ash/powder-type buildups throughout the unit. If powder/ash buildup is evident, we will further evaluate sampling and analysis to determine composition. This exercise is expected to confirm the effectiveness of our analytical approach to approving each load as we receive it.

In addition, there have been a number events in the past where ash or slag falling into the slag quench tank has resulted in the exceedance of an OPL. This is typically the OPL for pressure monitoring in the SCC (see. September 4, 2003 letter F.Sigg from G. Czerniak). These events are considered to be minor, since there is not any damage to equipment, and routine, since there is always some buildup of slag / ash in the SCC. These events are investigated by our MACT event team to determine the root cause. These events result in the exceedance of the SCC pressure monitoring OPL and typically last approximately 30 seconds. The corrective action for these events is to increase the draft on the system by opening the damper on the induced draft (ID) fan in order to return the system to negative pressure. Once all OPLs have been re-established, then waste feed operation is resumed.

All of these types of events are reported to the USEPA every six months along with all other MACT OPL's that are exceeded. As described in response to Question 8b, *infra*, these minor events are not attributable to the same cause as the July 2013 Incident.

It should be noted that, aside from the April 2011, March 2013, and July 2013 events discussed in detail in this response, there have been a total of 123 pressure exceedences attributed to clinker falls since 2010. There have been 15 such events throughout 2012 and year to date 2013. The total duration of these low severity events is approximately 19 minutes over the last 3 and a half years.

This response was prepared by Vince Waggle and Kevin Lloyd.

Question 13f: Submit copies of all manufacturers' instructions and facility instructions related to the removal, or the handling of ash/slag from the combustion chambers at the Facility.

Attached are the following standard operating procedures for instructions related to removal or the handling of ash/slag from the combustion chambers at the Facility:

RS-300	Slag Box Loading & End Dump Loading
RS-310	Reprocessing Slag
RS-320	Slag Dewatering

This response was prepared by Kevin Lloyd.

Question 14: Regarding HTS' maintenance plans for the hazardous waste incinerator:

Question 14a: Explain how HTS determines when the Facility should shutdown for planned maintenance, and what particular maintenance should be done.

HTS plans one large maintenance outage per year. This maintenance outage is scheduled based on the refractory in the rotary kiln. Since the refractory in the rotary kiln typically lasts approximately one year, a two week annual shut down is scheduled in order to replace the refractory lining. The shutdown is scheduled based on two criteria, (1) kiln shell temperature measurements and (2) internal inspections of the kiln refractory. Kiln shell temperatures are measured continuously and logged. Kiln shell temperatures will indicate where the refractory lining is thinning. Also, throughout the year, there are occasions when the kiln is offline. During these times, the kiln can be entered for inspections. A kiln inspection includes a refractory inspection where the refractory is drilled and measured to determine remaining refractory thickness. This measurement is then used to calculate a refractory wear rate which is used to extrapolate when the refractory will need to be replaced.

The maintenance conducted during an annual outage is based on operating experience, internal and external inspections, feedback from operations personnel, and review of process data. Maintenance activities during annual outages can include the following: refractory repair / replacement, inspections of air pollution control equipment, cleaning of air pollution control equipment and interconnecting ductwork, calibration of process instruments, and preventive maintenance for various pieces of equipment.

HTS also plans shorter shutdowns for maintenance and cleaning of the incineration system. The duration of these shutdowns is approximately five days. These shutdowns are scheduled based on the continuous review and trending of operating data collected from various instruments located throughout the incineration system, feedback from operations personnel, and scheduled inspections. It is the goal of HTS to schedule maintenance as necessary in order to regulatory compliance with all OPLs.

This response was prepared by Kevin Lloyd.

<u>Question 14b:</u> Provide copies of all documents that describe the Facility's internal procedures and decision making process relative to planned maintenance on the hazardous waste incinerator.

HTS has no procedures describing the decision making process relative to planned maintenance on the hazardous waste incinerator. HTS's operations personnel review and trend operating data, conduct inspections, and utilize operating experience for making decisions when planned maintenance should be scheduled for the incinerator. It is the goal of HTS to schedule maintenance as necessary in order to ensure regulatory compliance with all OPLs. If HTS personnel determine that there will be issues in maintaining OPLs, then recommendations are made for scheduling downtime in order to maintain the facility so that OPL events can be avoided. HTS then schedules maintenance for the incinerator per the description provided in the response to question 14(a).This response was prepared by Kevin Lloyd.

<u>Question 15:</u> Provide copies of the results and reports of the following types of testing and evaluations conducted on and after July 13, 2013 (whether or not such testing or evaluations were submitted to any regulatory agency).

<u>Question 15a:</u> Sampling and analysis (for metals or other contaminants) of the ash deposited at the Facility and throughout the community. Include in HTS' submittal any and all assessments of the amount of ash deposited (explain calculations and assumptions). Include any and all photographs of the ash deposits resulting from the Incident, whether at the Facility, or any other location.

Samples of the ash that was deposited in the community and within the Facility were collected right after the release and were tested for 23 compounds that are typically found in the Facility ash. See Question 7 for summary data of analytical for sampling of the ash.

In addition, HTS hired a third party to conduct additional sampling on-site and within the community in order to evaluate the extent of the July 13, 2013 release of boiler ash. The results of the third party sampling have been included. See the response to Question 5 for calculations regarding the amount of ash deposited.

This response was prepared by Carrie Beringer.

Question 15b: Ambient air quality test results in or around the Facility for the period from July 13, 2013 to the date of the information request.

Shortly after the release of boiler ash on July 13, 2013, an HTS employee conducted ambient air monitoring on-site at four (4) different locations. Two (2) locations were within the release zone. The remaining two (2) locations were located north of the release zone. The results from the ambient air monitoring are attached.

This response was prepared by Carrie Beringer.

Question 15c: Stack testing of emissions from the hazardous waste incinerator.

Heritage Thermal Services has not performed stack testing of emissions from the Hazardous Waste Incinerator since July 13, 2013. The most recent test of stack emissions occurred during the confirmatory performance test conducted on July 18-19, 2012. Results of this test were submitted to EPA on October 5, 2012. This test, performed in accordance with 40 C.F.R. Part 63 Subpart EEE, measured dioxin/furan (PCDDs/PCDFs) emissions from the stack during normal operations.

On August 6-8, 2013, Air Compliance Testing, Inc. of Cleveland, Ohio performed a Relative Accuracy Test Audit (RATA), Calibration Error test, and Absolute Calibration Audit of the Heritage Thermal Services Continuous Emissions Monitoring System and Continuous Opacity Monitoring System. Results of the test show that all challenged CEMS met the requirements of their applicable standards.

This response was prepared by Vince Waggle.

<u>Question 16:</u> In a July 16, 2013 electronic mail message to the Ohio EPA, Vince Waggle of HTS states: "...visible emissions were observed from the facility at the time of the event and for several minutes following." Explain how long visible emissions were observed from the Facility, who observed them and the range of opacity of the emissions. Submit copies of any and all visible emission observations taken on July 13, 2013.

There are no first hand observations by any trained personnel to quantify opacity of emissions associated with this event. Based on video recordings from two locations within the plant site, emissions were released for an estimated 1 minute 53 seconds. These video recordings are attached. Emissions that escaped formed a cloud that could be seen above the Facility for several minutes.

This response was prepared by Stewart Fletcher.